



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,891	09/27/2005	Mitsuaki Hata	Q90575	3716
23373 7590 05/09/2011				
SUGHRUE MION, PLLC				
2100 PENNSYLVANIA AVENUE, N.W.				
SUITE 800				
WASHINGTON, DC 20037				
EXAMINER				
JOLLEY, KIRSTEN				
ART UNIT		PAPER NUMBER		
1715				
NOTIFICATION DATE		DELIVERY MODE		
05/09/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM
USPTO@SUGHRUE.COM

Office Action Summary

Application No.

10/550,891

Applicant(s)

HATA, MITSUAKI

Examiner

Kirsten C. Jolley

Art Unit

1715

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-17, 19, 25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-17, 19, 25 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/27/11, 4/13/11, 4/21/11
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION**Response to Arguments**

1. Applicant's arguments filed February 28, 2011 have been fully considered but they are not persuasive.

Applicant argues that Kitano merely describes that the degree of vacuum during the reduced-pressure drying process is 13.3Pa, and neither discloses nor suggests that the degree of vacuum during the reduced-pressure drying process is controlled so as to suppress the flow of the resist from the center toward the periphery of the substrate, which is caused due to the temperature distribution and the centrifugal force in the unnecessary-film removing process. Applicant also states that in Kitano, the degree of vacuum is controlled so that the solvent in the resist solution is vigorously volatilized, whereby the surface of the wafer can be dried in a short time. By contrast, Applicant argues that in the present invention, the degree of vacuum is controlled considering the flow of the resist occurring in the subsequent process. Applicant states that neither of the references recognizes the problem about occurrence of the flow of the resist due to the temperature distribution and the centrifugal force in the unnecessary-film removing process in which the covering member is used and the substrate is rotated.

This is not convincing to the Examiner. By selecting a degree of vacuum (13.3 Pa) to be used in its reduced-pressuring drying process, Kitano et al. necessarily controls the degree of vacuum in the reduced-pressure-drying process. Kitano et al. teaches that the reduced-pressure-drying process results in a more uniform coating film than other drying methods (col. 2, lines 22-29; col. 3, lines 4-17; and col. 13, lines 12-20). Kitano et

Art Unit: 1715

al. is also concerned with non-uniformity in temperatures, and thus non-uniformity of the resulting coating film, in subsequent process steps such as transfer in the main arm area (col. 2, lines 29-35, and col. 13, lines 21-34). In response to applicant's argument that neither Hata nor Kitano recognizes the problem about occurrence of the flow of the resist due to a subsequent process (an unnecessary-film removing process), the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). It is well settled that the prior art need not disclose the same purpose for a claimed method in order to establish its obviousness under 35 USC 103. The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 409 or 904 (1991).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1715

3. Claims 1-2, 4-6, 8-9, 11-17, 19, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata (US 2002/0000424) in view of Kitano et al. (US 6,676,757).

Hata discloses a method for manufacturing a mask blank having a transfer pattern by depositing a film of resist liquid on a substrate by a spin coating process, and thereafter covering the surface of the substrate with a covering member and performing removal by dissolving an unnecessary part of the resist film by supplying a solvent from above the covering member during the rotation of the substrate and the covering member together so that the solvent is supplied to the periphery of the substrate. It is well known in the spin coating art that in the process of performing spinning to spread the coating to the outer periphery of the substrate, some drying of the applied liquid also occurs ("spin-drying"). Hata lacks a teaching of performing a reduced-pressure drying process for the spin-coated resist film prior to performing the unnecessary-film-removing process.

Kitano et al. similarly discloses a process for applying a resist film to a substrate and subsequently performing a coating film edge removal process at the outer periphery of the substrate (col. 11 and col. 12, lines 20-38). Kitano et al. also teaches the use of a reduced-pressure drying process, after coating of the resist film on the substrate and before the coating film edge removal (col. 11, line 62 to col. 12, line 19). Kitano et al. teaches that improved results are achieved when using reduced pressure drying as opposed to drying on a heating plate, which is conventionally performed after a spin coating process and before edge removal. Kitano et al. teaches that a reduced pressure drying process can be performed quickly and a temperature of the coating film can be maintained uniform, as well as uniformity of film thickness is maintained since reduced

pressure drying eliminates variations in the amount of volatilization in the film (col. 2, lines 14-35 and col. 3, lines 4-18). Further, Kitano et al. teaches that its reduced-pressure-drying process may be used in combination with a spin coating process (col. 25, lines 61-67). It would have been obvious to one having ordinary skill in the art, having seen the references of Hata and Kitano et al. in combination, to have performed a reduced pressure drying process in the method of Hata prior to performed the edge unnecessary-film-removing process with the expectation of increased efficiency in the process and increased uniformity of coating thickness and temperature of the film. The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. In re Rosselet, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); In re Hedges, 783 F.2d 1038. Additionally, KSR forecloses the argument that a **specific** teaching, suggestion, or motivation is required to support a finding of obviousness. See the recent Board decision Ex parte Smith, --USPQ2d--, slip op. at 20, (Bd. Pat. App. & Interf. June 25, 2007) (citing KSR International Co. v. Teleflex Inc., 550 U.S.--, 82 USPQ2d at 1396) (available at <http://www.uspto.gov/web/offices/dcom/bpai/prec/fd071925.pdf>).

As to the newly added-limitation in independent claims 1, 6, 25, and 26 of controlling a degree of vacuum in the reduced-pressure-drying process to suppress a flow of resist from a central part of the substrate toward the periphery of the substrate by a temperature distribution and a centrifugal force in the unnecessary-film-removing process, the Examiner notes that by selecting a degree of vacuum (13.3 Pa) to be used in its reduced-pressuring drying process, Kitano et al. necessarily controls the degree of

Art Unit: 1715

vacuum in the reduced-pressure-drying process. Kitano et al. teaches that the reduced-pressure-drying process results in a more uniform coating film than other drying methods (col. 2, lines 22-29; col. 3, lines 4-17; and col. 13, lines 12-20). Kitano et al. is also concerned with non-uniformity in temperatures, and thus non-uniformity of the resulting coating film, in subsequent process steps such as transfer in the main arm area (col. 2, lines 29-35, and col. 13, lines 21-34). It is well settled that the prior art need not disclose the same purpose for a claimed method in order to establish its obviousness under 35 USC 103. The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. In re Linter, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 409 or 904 (1991).

As to claim 2, Hata discloses the spin coating process in paragraph [0003]. While Hata does not specifically teach use of a cup having an opening on an upside, the Examiner takes Official notice that such a configuration for a spin coating cup is very well known in the spin coating art. It would have been obvious for one having ordinary skill in the art to have used an apparatus having an upper opening in the absence of a showing of criticality.

As to claim 4, Kitano et al. teaches use of a suction pipe 42b and suction pump 42c located at the topside of the cup in Figure 5. However it is the Examiner's position that it would have been obvious to an engineer having ordinary skill in the art to have

Art Unit: 1715

alternatively placed the pump and pipe at the downside of the cup with the expectation of similar results, as a matter of design preference, in the absence of a showing of criticality.

As to claim 5, it is the Examiner's position that the degree of vacuum is stepwise decreased in the process of Kitano et al. since the vacuum is turned on once the substrate is inside the container (col. 11, line 62 to col. 12, line 19).

It is noted that the process of Hata in view of Kitano et al. would produce a uniform film as claimed in claim 8.

As to claim 9, it is noted that the substrate is stationary when the reduced pressure drying is performed.

As to claim 11, Hata teaches that a baking process is performed after the edge removal in paragraph [0078].

As to claims 12 and 15, Kitano et al. teaches that the drying performed in a spin coating process ("spin-drying") results in about 90% drying. Such would necessarily result in the resist film formed at the periphery not having fluidity.

As to claims 13 and 16, Kitano et al. teaches that reduced-pressure-drying dries the resist film to an extent not to flow in col. 13, lines 11-20.

As to claims 14 and 17, the substrate in Hata is quadrangular as illustrated in the figures.

As to claim 19 requiring a difference between a maximum thickness and minimum thickness of the resist film is 50 angstroms or less, the Examiner notes that the difference in thickness in the combined process of Hata in view of Kitano et al. would necessarily be 50 angstroms or less after removing the peripheral resist film because the

Art Unit: 1715

claimed process and that of Hata in view of Kitano et al. have similar materials and process steps.

4. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata in view of Kitano et al. as applied to claims 1 and 6 above, and further in view of Okada (US 4,748,053).

Hata in view of Kitano et al. are applied as discussed above in section 3. The references lack a teaching of first applying the resist liquid at a first speed, and then spinning at a second, lower speed in the spin coating process. Okada is directed to a method of applying a resist film on a square photo mask substrate. Okada teaches that a uniform film is achieved on the square substrate when spreading of the resist occurs by rotating at a first speed, followed by drying during the spreading step by rotating the substrate at a second speed slower than the first speed (abstract and col. 2, lines 11-26). It would have been obvious for one having ordinary skill in the art to have performed the spin coating/drying process at two separate speeds, a first higher speed followed by a second lower speed as taught by Okada, in the process of Hata in view of Kitano et al. with the expectation of improved uniformity of the resist liquid coating since Hata is similarly directed to application of a resist film on a square photomask substrate.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 1715

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Tuesday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1715

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kirsten C Jolley/
Primary Examiner, Art Unit 1715

kcj